Head and Spinal Trauma

RIFLES

LIFESAVERS

Central Nervous System

- The brain and spinal cord comprise the central nervous system (CNS)
- The CNS is protected by bony structures, i.e., the skull and spinal vertebrae
- Injuries of the CNS and its protective structures can cause death or paralysis

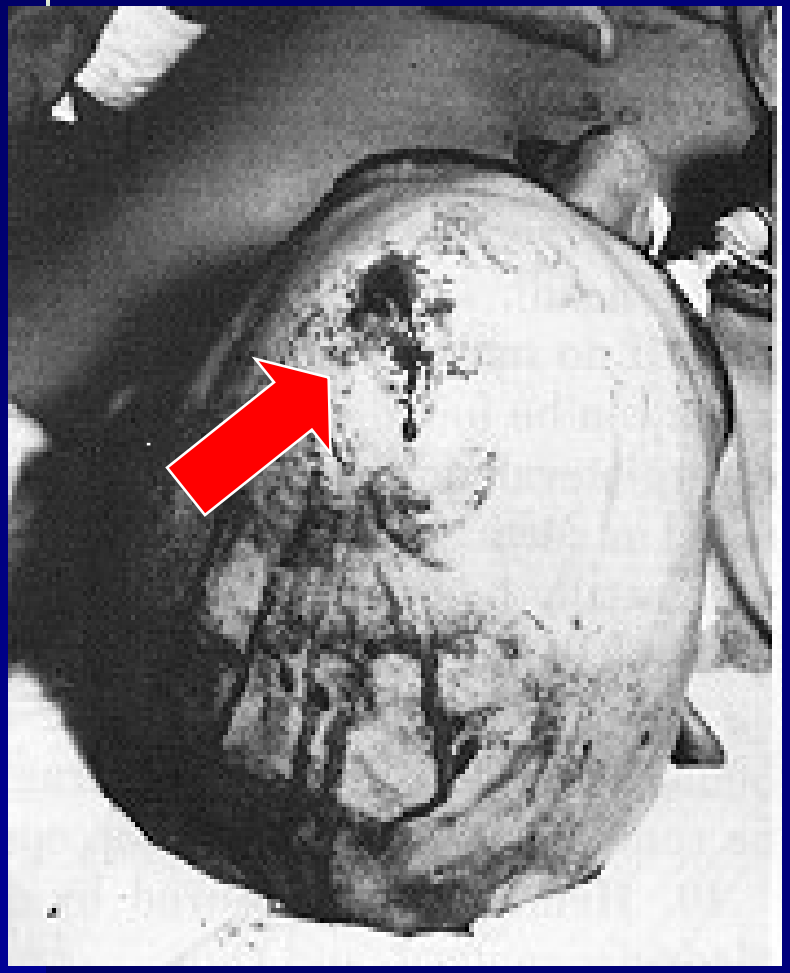
Principles of CNS Injury Care

- Observe principles of TCCC
  - Care Under Fire
  - Tactical Field Care
  - Casualty Evacuation Care
- Follow the ABCs
- Spine immobilization to avoid further injury to spinal cord

Open Head Injuries

- Due to penetrating or blunt trauma
- Signs and symptoms
  - Usually unconscious
  - Open skull fracture
  - Exposed brain tissue
  - Pupillary changes
- Open head injuries are usually catastrophic and result in death

Gunshot Wound to Head



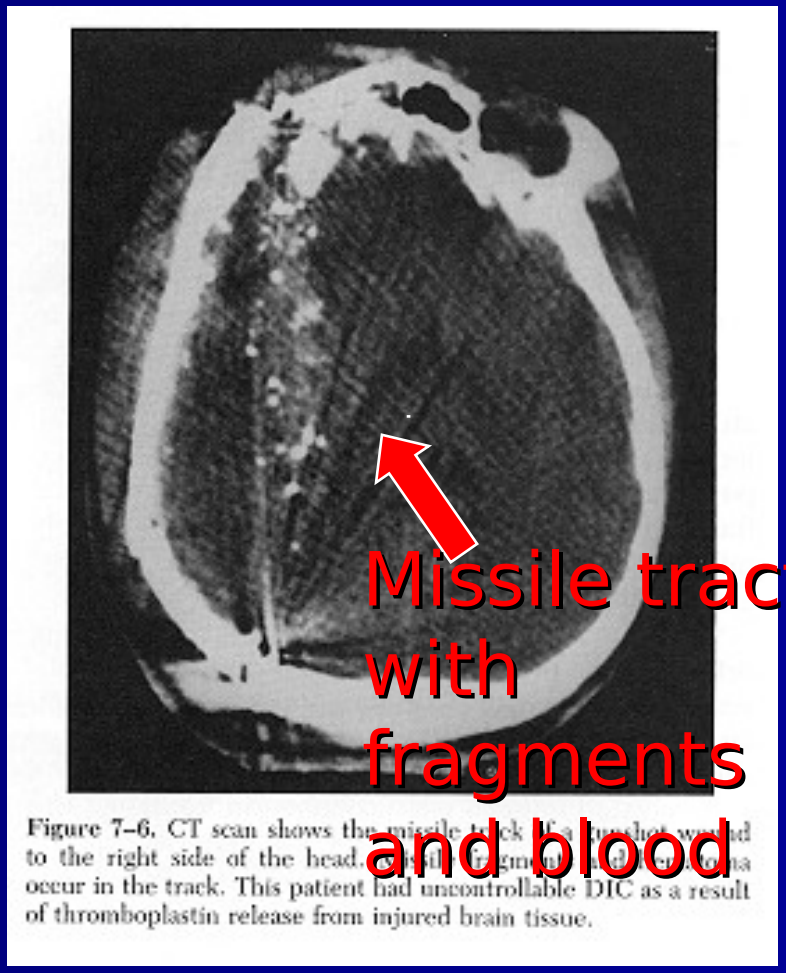


Figure 7–6. CT scan shows the missile track of a gunshot wound to the right side of the head. Cerebral fragmentation and hematoma occur in the track. This patient had uncontrollable DIC as a result of thromboplastin release from injured brain tissue.

Open Facial Injuries

- Brain may not be involved in facial trauma
- Maintain a clear airway
- Bleeding may be profuse
  - STOP THE BLEEDING!
- Apply cervical spine immobilization if blunt trauma

Impalement Injuries

- **DO NOT REMOVE OBJECT OR EXERT ANY FORCE UPON IT!**
  - Severe bleeding may occur causing shock
- Check pulses distal to impaled object
- Immobilize the object
- Apply bulky support bandages to hold in place

Closed Head Injuries

- Due to blunt trauma
- Skull may be fractured
- Severe brain injury may be present in absence of skull fracture
- Underlying brain injury may be more severe than immediately apparent

Signs and Symptoms of Closed Head Injuries

- Deformity of head
- Blood or clear fluid from nose or ears
- “Raccoon eyes”
- Bruising behind ear
- Pupillary changes
- Confusion or unconsciousness
- Headache

Assessment of Head Injuries

- Level of consciousness using AVPU scale
  - Alert: Converses spontaneously and appropriately
  - Verbal: Responds to verbal stimuli
  - Painful: Responds to painful stimuli
  - Unresponsive: Unresponsive to any stimuli
- Pupil size
  - Pupils should be equal and constrict vigorously to light stimulus
- Motor function
  - Strength should be normal and equal in all extremities

Posturing

- Occurs with severe brain injury when patient is near death

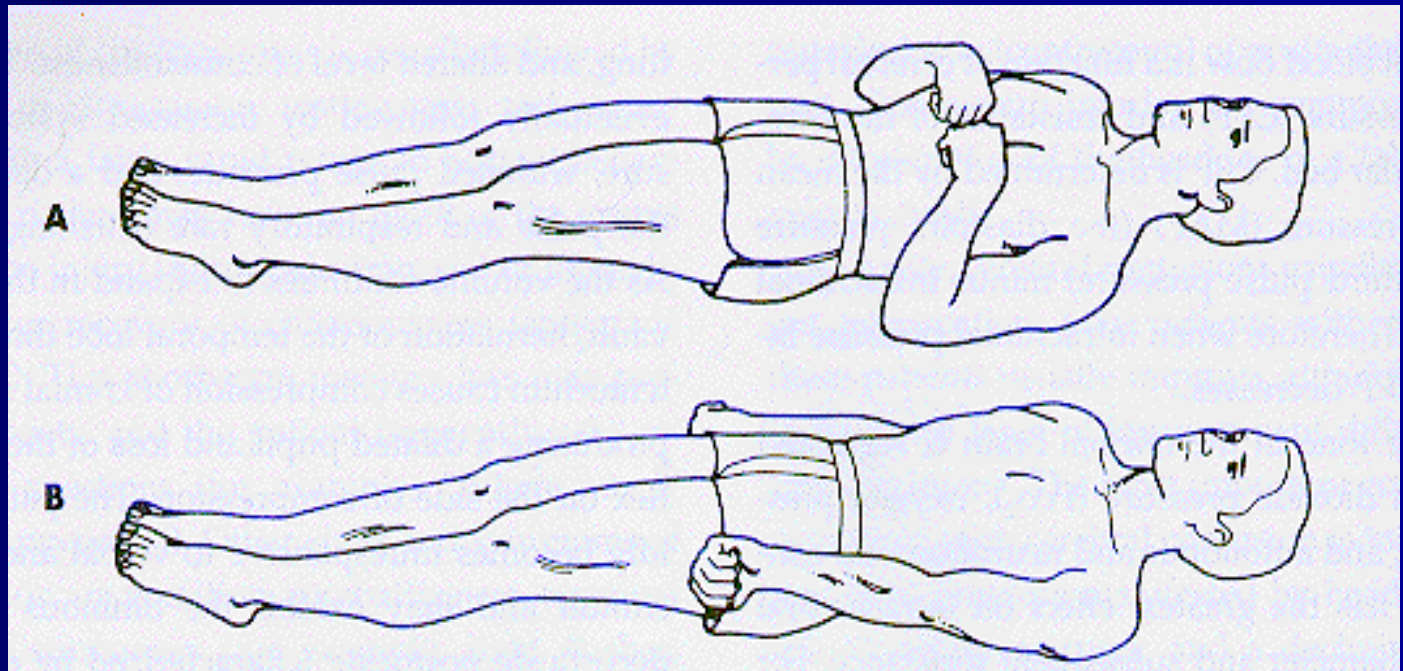


Fig. 15-25 A, Abnormal flexion (decorticate posturing). **B,** Abnormal extension (decerebrate posturing).

Treatment of Head Injuries

- Remember ABCs
- Apply cervical collar if appropriate
- Dress the head wound to control bleeding
- Elevate head of litter to decrease pressure on brain
- Evacuate to surgical assets

Spinal Cord Injuries

- May occur with neck or back trauma
- Associated with blunt head trauma, especially when casualty is unconscious
- Can occur with penetrating trauma of vertebral column
- Improper handling may cause further injury

Mechanisms of Spinal Injury

- Hyperextension
- Hyperflexion
- Compression
- Rotation
- Lateral Stress
- Distraction

Description	Diagram	Examples
Hyperextension Excessive posterior movement of head or neck		Face into windshield in MVC Elderly person falling to the floor Football tackler Dive into shallow water
Hyperflexion Excessive anterior movement of head onto chest		Rider thrown off of horse or motorcycle Dive into shallow water
Compression Weight of head or pelvis driven into stationary neck or torso		Dive into shallow water Fall of greater than 10 to 20 feet onto head or legs
Rotation Excessive rotation of the torsoor head and neck, moving one side of the spinal column against the other		Rollover MVC Motorcycle accident
Lateral Stress Direct lateral force on spinal column, typically shearing one level of cord from another		"T-bone" MVC Fall
Distraction Excessive stretching of column and cord		Hanging Child inappropriately wearing shoulder belt around neck Snowmobile or motorcycle under rope or wire

Signs and Symptoms of Spinal Cord Injuries

- Neck or back pain
- Penetrating injury of neck or back
- Tenderness to palpation of spine
- Loss of strength in extremities
- Loss of feeling in extremities
- Paralysis
- Incontinence

Assessment of Spinal Cord Injuries

- Observe principles of TCCC
  - "The best medicine on any battlefield is fire superiority"
- Follow the ABCs
- Maintain high index of suspicion for spinal cord injury in appropriate setting
- Secure and maintain spinal immobilization throughout evacuation

Spinal Immobilization

- Immobilize the casualty's head and neck manually
- Apply a cervical collar, if available, or improvise one
- Secure patient to short spine board if extracting from a vehicle
- Secure head and neck to spine board for extraction

Spinal Immobilization

- Transfer patient to long spine board as soon as feasible
- Logroll in unison
- Stabilize head and neck with sandbags or rolled blankets

- Secure casualty to long spine board with straps across forehead, chest, hips, thighs, and lower legs

Questions?